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MODERN AND EFFECTIVE APPROACHES TO THE TREATMENT OF CANINE WOUNDS

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Annotation. This article presents the results of a study on the treatment of purulent wounds in dogs using the probiotic Innoprovet2 in various combinations (with and without antibiotic). It was found that under the influence of Innoprovet2 the average period of wound healing in dogs was: in the first experimental group 22-24 days, in the second experimental group 16-18 days, and in the control group - 26-28 days. During the experiment, the wound healing process and the condition of the dogs were observed for 28 days. ImitoMeasure program was used to evaluate the wound surface in all groups, and a systematic evaluation of the wound condition was performed.

Keywords: Wound, probiotic, ImitoMeasure, antibiotic, ciprofloxacin, pus, sorbents, infection.

Introduction At present, in both human and veterinary medicine, surgical disorders account for approximately 30–35% of cases, frequently manifesting as acute and chronic purulent diseases. The lack of comprehensive treatment strategies for wound processes disrupts homeostasis and impairs the function of internal organs, which in turn diminishes the efficacy of pharmacological interventions and contributes to the development of complications [3].

A wide range of therapeutic agents—including antibiotics, proteolytic enzymes, bioactive sorbents, and physical treatment modalities such as laser therapy, ultrasound, and hyperbaric oxygenation—are routinely employed in the management of wounds and wound-related infections [2]. However, due to the limited scope of these therapeutic approaches, the treatment of purulent wounds remains a pressing challenge. Therefore, the development of novel therapeutic strategies and the implementation of environmentally safe agents constitute a major focus of contemporary research efforts [5,7,8,9].

Probiotic preparations can be administered in various formulations, including powders, pastes, or aerosols, often combined with auxiliary substances or sorbent mixtures [5]. A significant proportion of pathogenic microorganisms implicated in wound infections exhibit resistance to conventional antibiotics. Among the promising candidates with both antimicrobial and regenerative properties is the probiotic bacterium Bacillus subtilis, which is capable of synthesizing antibiotics [1,4] and bacteriocins [5].

These bacteria also enhance wound healing by producing proteolytic enzymes, demonstrating antioxidant activity [1,4,5,6], exerting thrombolytic effects, and preventing excessive scar formation. Several authors have reported the successful application of probiotic

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formulations such as Bioseptin, Bactisporin, Sporobacterin, and Bactisporin for the treatment of uninfected wounds, purulent-necrotic processes, burns, and dermatitis.

Objective of the Study This research was dedicated to investigating the effects of probiotic administration in the treatment of purulent wounds in dogs.

Object of the Study Nine dogs were selected as experimental subjects and randomly allocated into three groups: two experimental groups and one control group. In the experimental animals, standardized wounds were created in the femoral region using the method described by Sukhovei (2008).

Study Site The experiments were conducted at the Veterinary Surgery and Obstetrics Department Clinic of Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnologies.

Materials and Methods To assess the therapeutic properties of the probiotic Inoprovet-2, the nine dogs were divided into three groups. In all animals, wounds were surgically induced on the lateral surface of the thigh and inoculated with Streptococcus pyogenes isolated in previous studies to establish a model of purulent infection.

After 72 hours, upon confirmation of purulence, all groups received daily wound irrigation with a 1:5000 furacilin solution.

In Experimental Group I (three dogs), drainage with Inoprovet-2 probiotic was applied to the wounds, and the probiotic was also administered orally at a dose of 5 ml of suspension (containing 1×10^9 CFU/ml) twice daily.

In Experimental Group II, the probiotic was given orally at the same dosage, and ciprofloxacin was administered intramuscularly at a dose of 1 ml.

In the Control Group (Group III), wounds were treated topically with 0.4 ml of ciprofloxacin solution.

For oral administration, the dry probiotic was reconstituted at a concentration of 1 g per 1,000 ml of water. For topical application (drainage), it was diluted at a ratio of 1 g per 100 ml of physiological saline (tab-1).

Table 1. Experimental design for assessing the efficacy of Inoprovet-2 probiotic in dogs with purulent wounds

Group	Number of Dogs	Treatment Modality	Dosage and Application Details
Experimental Group I	3	Inoprovet-2 probiotic (oral + topical drainage)	Oral: 5 ml of suspension (1×10^9 CFU/ml) twice daily; Topical: drainage application diluted 1 g in 100 ml saline
Experimental Group II	3	Inoprovet-2 probiotic (oral) + ciprofloxacin (intramuscular)	Oral probiotic as above; Intramuscular ciprofloxacin: 1 ml once daily
Control Group III	3	Ciprofloxacin (topical)	Topical application: 0.4 ml solution to wound surface

Results of Clinical and Planimetric Evaluation of Purulent Wound Healing in Dogs
According to the results of clinical and planimetric observations, during the initial days following the induction of purulent wounds, all three groups of dogs exhibited marked systemic

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reactions. General malaise was noted, with body temperature rising by 1–1.5 °C (reaching 39–40 °C). Heart rate increased up to 120 beats per minute, and respiratory rate reached 37 breaths per minute.

On palpation, wounds were painful and edematous, with irregular and rounded edges covered by serous exudate. The wound surfaces were moist and shiny, with mild swelling and uniform hyperemia observed across all groups.

By day 7, a slight reduction in wound area was recorded in both the control group and the first experimental group. In the control group, the wound surfaces appeared dark red, moist, and with moderately irregular margins. Palpation elicited pain, and purulent discharge was present. In contrast, dogs in the second experimental group developed dry, thin black scabs covering the wound surface.

On day 14, granulation tissue proliferation was evident in the control and first experimental groups. The wound periphery remained mildly edematous but was no longer painful. In the control animals, the black scab persisted along the wound surface, which remained slightly moist. In the second experimental group, the wound margins appeared smooth, with no pain upon palpation. Visual examination showed clear reduction in wound size, and scar formation along the edges was observed, indicating the onset of epithelialization. Throughout the study period, clinical indicators and general condition of all dogs were assessed as satisfactory, with preserved appetite in all groups. Quantitative wound measurements were performed in all animals using the ImitoMeasure smartphone application for digital analysis.

On day 21, in the control group, a uniform black scab covered the entire wound surface, with smooth and rounded wound margins.

In the first experimental group, progressive epithelialization was observed along the wound periphery. In the second experimental group, complete epithelialization had occurred, accompanied by visible hair regrowth within the wound area. Wound healing and the overall condition of the animals were monitored for a total of 28 days.

The mean duration required for complete wound closure varied between groups:

In the control group, complete healing occurred between days 26 and 28.

In the first experimental group, wound closure was achieved between days 22 and 24.

In the second experimental group, healing was completed significantly earlier, between days 16 and 18.

Following the treatment interventions, the reduction in wound area on day 21 demonstrated marked intergroup differences:

Table 2. Healing Time and Residual Wound Area in Experimental Groups

Group	Time to Complete Healing (days)	Residual Wound Area on Day 21 (cm^2)
Control Group	26–28 (mean: 27 ± 0.8)	1.0 ± 0.4
Experimental Group I	22–24 (mean: 23 ± 0.7)	0.7 ± 0.2

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Experimental Group II	16–18 (mean: 17 ± 0.6)	0.3 ± 0.1

Healing Time: $F(2,6)=52.3$, $p < 0.001$

Residual Wound Area: $F(2,6)=28.6$, $p < 0.001$

In the control group (treated with furacilin irrigation and topical ciprofloxacin), the average residual wound area measured 1.0 ± 0.4 cm². In the first experimental group (furacilin irrigation combined with oral probiotic administration and probiotic drainage), the residual wound area was 0.7 ± 0.2 cm². In the second experimental group (furacilin irrigation, oral probiotic administration, topical probiotic application, and intramuscular ciprofloxacin), complete wound closure was observed in the majority of animals, with minimal residual wound area averaging 0.3 ± 0.1 cm².

Conclusion The results of this study demonstrated that the treatment regimen combining oral administration of Inoprovet-2 probiotic, initial wound irrigation with furacilin solution, subsequent probiotic drainage, and intramuscular ciprofloxacin effectively promoted debridement of necrotic tissues and reduced edema within 4–5 days. This approach also stimulated granulation tissue formation and significantly accelerated the overall wound healing process compared to conventional treatment methods.

References:

1. Kajimura, M., Sugiyama, M., & Kaneda, M. (2005). Bacillopeptins, new cyclic lipopeptide antibiotics from Bacillus subtilis FR-2. The Journal of Antibiotics, 58(10), 1095–1103.
2. Sugawara, G., Goto, M., Shirasaka, D., Nomoto, K., Nakano, H., Nagino, M., & Nimura, Y. (2006). Perioperative synbiotic treatment to prevent postoperative infectious complications in biliary cancer surgery: A randomized controlled trial. Annals of Surgery, 244(5), 706–714.
3. Huang, J. M., La Ragione, R. M., Nunez, A., & Cutting, S. M. (2008). Immunostimulatory activity of Bacillus spores. FEMS Immunology & Medical Microbiology, 53(2), 195–203.
4. Stein, T. (2005). Bacillus subtilis antibiotics: Structures, syntheses and specific functions. Molecular Microbiology, 56(4), 845–857.
5. Yuldasheva, M., Narziyev, B. D., Ravshanov, M. A., & Mamatova, Z. B. (2024). Effect of probiotic bacteria of the genus Bacillus on gnorobic pathogens of surgical infections. BIO Web of Conferences, 95, 01033.
6. Yuldasheva, M. K., Narziyev, B. D., & Mamatova, Z. B. (2024). The effect of probiotic bacteria of the genus Bacillus on pathogens of purulent wounds. Veterinary Research, 6, 21–24.
7. Intizarov, M. M. (2007). Microflora tela zhivotnykh [Microflora of animal bodies]. Veterinarnaya Meditsina. Retrieved from
8. Malik, N. I., Panin, A. N., & Malik, E. V. (2000). Probiotiki v promyshlennom zhivotnovodstve [Probiotics in industrial animal husbandry]. Zhivotnovodstvo, (3), 10–16.

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9. Matrosova, L. E., Tarasova, E. Yu., & Tremasov, M. Ya. (2009). Spektr primeneniya probiotika Entosporin v veterinarii [Spectrum of application of the probiotic Entosporin in veterinary practice]. Trudy Kazanskoy GAVM im. N.E. Baumana, 197, 101–105.